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CASE OF AXILLARY ANEURISM;

SUCCESSFUL LIGATION OF LEFT SUBCLAVIAN BETWEEN THE SCALENI;
SUPPURATION OF THE TUMOUR; HEMORRHAGE ON THE FORTY-
THIRD DAY; GANGRENE OF LIMB; LIGATION OF SUB-
SCAPULAR ARTERY; AMPUTATION OF ARM AT
UPPER THIRD; HEMORRHAGE ON SIXTY-
SEVENTH DAY; REMOVAL OF
HUMERUS AT THE JOINT;
RECOVERY.

BY THOMAS GEORGE MORTON, M.D.,

ONE OF THE ATTENDING SURGEONS OF THE PENNSYLVANIA HOSPITAL, AND ONE OF THE
SURGEONS OF THE WILLS (OPHTHALMIC) HOSPITAL, PHILADELPHIA.

(WITH FOUR WOOD-CUTS.)

THE following case of aneurism involving the axillary artery has been reported at considerable length, on account of the comparative rarity of the disease, as well as the operation performed; while the very interesting series of events which followed, and secondary operations which were required, render some minuteness unavoidable.

Only two cases have been recorded where the subclavian artery has been ligated in this city, and both of these operations were performed for the relief of aneurisms of traumatic origin. The first has been reported by Professor Gibson, in 1828,¹ the axillary artery was ruptured during the reduction of a dislocated humerus of nine weeks' standing; the subclavian was ligated outside of the scalenus, erysipelas and incipient gangrene followed, and the patient died on the seventh day.

The history of the second case was read before the College of Physicians, by Dr. H. E. Drayton,² in October, 1859; the patient was admitted into the Episcopal Hospital, with "obscure injuries about the shoulder and side caused by a recent fall;" a pulsating tumour rapidly developed, ligation of the subclavian was performed which resulted fatally from pyæmia on the twenty-second day.

During the late war the subclavian was ligated more frequently (excepting the carotid, femoral, and brachial) than any other artery;³ one of these

¹ American Journal Med. Sci., May, 1828, p. 136, with two plates.

² American Journ. Med. Sci., vol. xxxviii. p. 402, 1859.

³ Circular No. 6, S. G. O., 1865, p. 78.

operations was performed by myself, at the "Mower" hospital, Chestnut Hill, during my service as consulting surgeon; sloughing and hemorrhage followed a gunshot wound of the armpit; the axillary was tied; hemorrhage recurring, I ligated the third portion of the subclavian.

I am under obligations to Dr. Barnes, Surgeon-General U. S. A., for the following report, furnished me by Brevet-Major G. A. Otis, Assistant Surgeon U. S. A., Curator of the Army Medical Museum, of the operations performed in the Military Hospitals in this Department.

"Of the thirty-five cases of ligation of the subclavian recorded in Circular No. 6, S. G. O., 1865, seven occurred in Philadelphia. Six of these cases terminated fatally.

"The operators were Gross, Coolidge, Hopkinson, Kennedy, Levis, Wells, and yourself. The successful case was Levis, done at Christian St. (Hospital). Primary amputation of the arm, June 19th, 1864, on the field; ligation of axillary by Dr. Boyd, July 25th; secondary hemorrhage, ligation of subclavian over first rib, Aug. 8th; discharged cured, April 6th, 1865.

"Your case was a secondary ligation at 'Mower,' terminating fatally July 1st, 1864. It furnished specimen No. 2545, to the Army Medical Museum.

"A fatal case, not recorded in Circular No. 6, occurred at Philadelphia, Sept. 17th, 1864, at Satterlee Hospital."

Mr. Crisp,¹ in a table of 551 spontaneous aneurisms, reports 18 only of the axillary artery; and among 364 preparations of aneurism, carefully examined by him in the various museums of London, 8 only were found of the axillary artery.

Dr. Wm. Pepper, Curator of the Penna. Hospital Museum, informs me that he has been unable to find a single specimen of spontaneous axillary aneurism in the museums of this city.

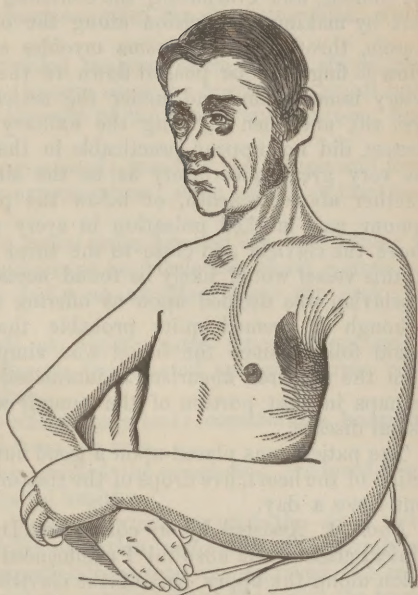
CASE. Francis McKoen, aged 51, a stone-mason, born in Ireland, was brought to the Pennsylvania Hospital, in an ambulance, on the 7th of November, 1866, and admitted into the lower surgical ward on account of a large pulsating tumour of the left axilla.

About the first of June, the patient's attention was directed to an unpleasant tingling and numb sensation, along the outside of the arm and forearm, and especially in the course of the little finger, "as if the parts were asleep; this gradually increased, and soon the entire limb to the region of the deltoid became involved. In the latter part of the month of August, he discovered while bathing a tumour in the armpit about the size of a chicken egg, which was painless on pressure, and gave such a trifling amount of pain, except when the arm hung down, that he was able to perform as usual his heavy work until the early part of September, when he sought medical assistance.

About the first of October, the pain in the arm grew worse, and the tumour increased rapidly in size; soon the axilla was filled up, and with this increase, intense pain throughout the entire limb was experienced, which was afterwards of the most excruciating character; loss of all sensation and motion followed, with great œdema of the arm; powerful opiates were taken, and sedative lotions to the tumour afforded little or no relief.

¹ Diseases of the Bloodvessels.

Fig. 1.



On examination a strongly pulsating tumour was found, see Fig. 1, which distended the axillary region to such an extent that the arm was forced away from the side, and which also produced considerable elevation of the shoulder; the tumour extended across the chest towards the sternum, and could be felt above the clavicle, but the subclavian space seemed uninvolved. The skin covering the axillary portion of the tumour was so attenuated that bursting of the tissues seemed imminent; already several ulcerated points gave vent to a few drops of softened clot of blood. The temperature of the arm, and especially the hand, was considerably diminished, and no pulse could be felt in the radial or brachial arteries; the limb was at least double the natural size, on account of the cedematous effusion. The least move-

ment of the arm which had been devoid of all sensation and voluntary motion for three weeks, produced intense pain, which was referred principally to the region of the shoulder. The subclavian artery was found deeply situated, and when compressed upon the first rib entirely controlled all pulsation and thrill; the former extended to every portion of the tumour and could be seen at a considerable distance, while the latter was most distinct at the more prominent portion of the axilla. The disease was evidently aneurism involving the axillary artery, and from the history appeared to be of that variety described as consecutive diffused, the effusion resulting from the rupture of a circumscribed aneurism.

While the disease was increasing, it was evident that before long the patient would perish from hemorrhage, unless the flow of blood through the tumour were arrested.

Since spontaneous coagulation in the aneurism was hardly possible, and operative measures alone held out a chance for what otherwise would soon certainly prove fatal; it became a question as to the course to be pursued.

Amputation at the shoulder-joint with ligation of the axillary high up, would under some circumstances have been proper, since it was likely that the arm would never be of service, on account of the permanent injury which the nerves had sustained from the pressure of the tumour; but the risks from hemorrhage would be great, for the subclavian was deeply situated, and pressure upon it could hardly have been depended upon to control hemorrhage while seeking to ligate after an amputation.

The plan recommended by Mr. Syme¹ of making a free incision into

¹ Med.-Chir. Trans., vol. xliii. p. 137.

the tumour, and evacuating the contents, first controlling the flow to the part by making an incision along the outer edge of the sterno-mastoid muscle, through the platysma myoides and fascia of the neck, so as to allow a finger to be pushed down to the situation where the subclavian artery issues from, and under the scalenus anticus, and lies upon the first rib, and then ligating the axillary above and below the seat of disease, did not appear practicable in the present instance, on account of the very great uncertainty as to the situation of the original disease, whether above, beneath, or below the pectoralis, the great size of the tumour, and marked pulsation in every part. While the tumour being above the clavicle and close to the third part of the subclavian, ligation of this vessel would likely be found necessary after all. Ligation of the subclavian was decided upon as offering a reasonable chance of success; although it seemed quite probable that suppuration of the tumour would follow, since the blood was simply poured out into the tissues from the ruptured aneurism, a laminated clot not having formed except perhaps in that portion of the tumour which formed the original aneurismal disease.

The patient was placed upon a good nutritious diet, and to diminish the action of the heart, five drops of the tincture of veratrum viride were ordered four times a day.

Nov. 14. Assisted by my colleagues, Drs Hunt and Agnew, before the clinical class of the hospital I commenced the operation by making an incision along the upper part of the clavicle four inches in length, the skin having been drawn down over the chest; the external jugular vein swelled up enormously and seemed as if it might give some trouble. Two small arteries required ligation; then with careful division and tearing the subclavian triangle was soon exposed, the omo-hyoid was drawn upwards and the scalenus anticus traced down to the first rib; the artery now appeared to lie immediately under the finger; with a little scratching the vessel itself seemed to be at the bottom of the wound. An aneurismal needle with ligature attached was passed, not tightened, but merely drawn upwards when it was found that the ligature had been passed under the lower cord of the plexus of nerves which laid above the vessel. The artery was now felt more deeply situated, the ligature was withdrawn and the vessel found about a half inch beyond, but the aneurismal tumour being in close proximity, it was determined to divide the scalenus and to place the ligature upon the artery in its second portion. The division of this muscle was readily accomplished, and the ligature was placed under the vessel, being more than three inches below the surface. With tightening of the ligature there was immediate cessation of all sound and pulsation. The wound was brought together with four leaden sutures, the skin moistened with olive oil, and dry charpie placed on the parts, with a bandage to keep the arm and dressings in place.

The patient was somewhat exhausted from the protracted operation, which lasted nearly one hour; but soon rallied after the administration of some brandy and water; there was hardly any blood lost during the operation, and fortunately no venous trunk was wounded.

Nov. 14. Evening: pulse 132; quite comfortable; has been asleep; had no pain; taken freely of cold milk and arrowroot; about a teaspoonful of blood has oozed since noon; half a grain of morphia to be taken at 10 P. M. and to be repeated if necessary.

15th. Pulse 124; skin natural; tongue a little coated; slept well; general

condition good; no swelling or redness about the wound. Evening: The bandage was cut away and fresh charpie applied, the skin being oiled; wound looks very well.

16th. Pulse 120; very comfortable; tongue a little thick; sleeps much of the time; has had no pain in the arm since the operation; small quantity of healthy pus exuding by the side of the subclavian ligature; has a slight cough.

17th. Pulse 110; skin and tongue good; removed the sutures and found the wound united; cough, but no expectoration; some redness in the tissues about the incision.

18th. Pulse 110; doing well; radial pulse detected but very feeble; the œdema has entirely left the hand; says he "feels the blood coursing to the fingers." Evening: Pulse 106; no swelling about the neck; the tumour is subsiding.

19th. Pulse 108; sleeps well at night; some mucus expectorated; ordered an enema. Evening: Bowels freely acted and gave great relief; half a grain of morphia at bedtime.

20th. Pulse 100; general condition excellent; considerable hoarseness and cough; œdema disappeared from the arm.

21st. Doing well; the morphia quieted the cough and produced sleep; tongue clean; pulse 100; discharge healthy.

22d. Pulse 96; one of the ligatures which secured the small artery divided during the early part of the operation, came away this morning.

24th. Pulse 96; the other superficial ligature was removed this morning; good union in the wound and no swelling about the neck; the tumour has diminished very much in size, is quite soft, and looks as if it would suppurate.

25th. Pulse 92; the cough which has troubled him for several days has assumed a paroxysmal character, coming on at long intervals and with no expectoration; percussion and auscultation reveal no disease in the chest. The ribs below the clavicle can now be felt, and the head of the humerus can also be traced on its anterior face; after removing some dried blood and matted hair from the axilla, an ulcerated condition of the skin was found about an inch in length and half an inch in width, through which could be seen a mass of clotted blood; from this point on the day of operation a few drops of blood had exuded, showing the necessity for early operative interference.

26th. Rapid diminution of the tumour; has free perspiration; pulse 86; ordered six grains of quinia daily; no collection of pus in the wound; spasmodic cough continues, probably due to irritation of the phrenic nerve caused by the proximity of the ligature.

Dec. 2. 9.30 A. M. Ligature came away this morning—18 full days; cough, which has been decreasing for the last few days, has now almost vanished; complains of pain down the arm as far as the elbow; taken no stimulants since the operation; the tumour presents signs of suppurating; small clots are being discharged through the opening in the axilla, which has been enlarging.

5th. Pulse 84; passed best night since the operation; the axillary tumour is subsiding, and discharging about a tablespoonful of softened blood daily.

7th. The axillary wound discharging more, and large clots are removed in each dressing; able to sit up in bed; arm supported on pillows; one bottle of porter daily ordered.

12th. 29th day. Hardly any discharge from the wound of operation; free discharge from the axilla, and pus observed with the softened clots; general condition good; pulse 84.

14th. The suppuration in the tumour has been increasing for the past two days, and the axilla has an inflamed appearance; the patient seems restless and the pulse is more quick to-day; wound of operation entirely closed up and parts firm; some exhaustion; ordered an ounce of whiskey three times a day; appetite is not so good as heretofore.

15th. This morning the entire contents of the tumour, consisting of fetid broken-down clots and pus, amounting to nearly a quart, came away on removing the dressings; some of the clots were as large as a hen's egg; the tumour entirely subsided, but not one drop of arterial blood came away; the odour arising from the discharge and the drain has materially affected the patient, and the stimulants were consequently increased; two bottles of porter daily and half an ounce of brandy every three hours, with beef-tea and eggs.

16th. Copious discharge from wound; general condition more favourable; more clots came away in the dressings; pulse soft and good; wound washed with a solution of permanganate of potash.

18th. Discharge assuming a more purulent character and less in amount during the past few days; skin of the arm when friction is applied assumes a natural healthy hue; the axilla when cleansed revealed deadened nerves and vessels and portion of the original sac of the aneurism, contracted and hard to the touch, lying high up in the cavity.

26th. On making slight traction upon a protruding portion of sloughing nerve, it readily came away, and with it a bundle of small nerves about two inches in length; the main portion of nerve measured six inches, and was excessively offensive; good healthy granulations were observed in all parts of the axillary space and the discharge entirely purulent.

27th. 4.45 A. M. Francis was awakened by a feeling of heat on his left side, and sliding his hand along the chest, discovered blood; Dr. Williams, the resident surgeon, was immediately summoned, and found that a fearful hemorrhage had occurred through the axillary wound, probably exceeding two quarts; the axillary space was filled with clots, while the blood had coursed along the mattress and soaking through it had reached the floor, making a large pool; on moving the arm, seeking the origin of the hemorrhage, a fierce gush of blood followed; Dr. Williams controlled the bleeding by forcing into the cavity a plug of lint soaked in the persulphate of iron, and then applied the horse-shoe tourniquet, making firm pressure, which forced the plug firmly within the axillary cavity. Excessive prostration followed this with two attacks of syncope, from which the patient rallied after vigorous stimulation; the pulse was for several hours very weak, the skin blanched and covered with moisture; the left arm very white and quite cold. Evening: Circulation in left arm partly re-established and some warmth in the fingers; no hemorrhage since morning, the pressure of the tourniquet not having been taken off; has been able to take all the nourishment and stimulants, the stomach remaining perfectly sound; is comfortable, and disposed to sleep.

28th. Being unable to go to the hospital on account of severe indisposition, Dr. Williams writes: "McKoen passed a comfortable night and is in good condition this A. M., at present asleep (7 A. M.), so cannot particularize as to pulse, &c."

Evening: Dr. Herbert writes: "I have just seen the man, and I think

he is doing very well; quite a good pulse, no hemorrhage, and is very comfortable."

29th. Continues same, but very weak; has taken every hour small doses of acetate of lead and opium; alternate hours stimulants with strong beef soup and milk; no hemorrhage.

11 P. M. Had a slight hemorrhage amounting to two ounces controlled by re-adjustment of the tourniquet, which had worked somewhat out of position.

30th. 7 A. M. Hemorrhage amounting to an ounce escaping by the side of the tourniquet; had a violent chill; 9.30, hemorrhage; profuse perspiration; quick pulse; tongue moist; tissues about the shoulder much swollen from the pressure and the collection of blood under the skin; bleeding controlled by the compressor, which when loosened in the least permits the blood to gush forth.

12.30. A consultation was called in regard to the practicability of securing the bleeding vessel or amputation at the shoulder-joint, as it was evident from the drain the limb would perish; during the consultation the patient was seized with a violent chill, which necessitated an abandonment of all operative interference. Evening: Considerable collection of air in the tissues about the shoulder. To relieve this I passed into the part an exploring needle, and let escape some very fetid gas; following this, arterial blood jetted forth, and pressure was required to arrest it; the space vacated by the air was soon filled up by blood; this increased the pressure upon the shoulder and gave intense pain, which was only relieved by morphia.

31st. 48th day. Another violent chill; entire surface becoming purple, followed by hemorrhage; pulse very feeble; tongue exceedingly dry; shoulder greatly swollen; firm pressure required to control the hemorrhage; has peculiar sickish sweet smell indicative of pyæmic involvement; very sallow; surface clammy; the continued drain of blood has so much impaired the vitality of the left arm that signs of local sphacelation are beginning to appear; the hand is very cold and has a leaden appearance.

1867. Jan. 1. Another hemorrhage; the original plug being still in the axilla, but on the slightest movement of it the blood gushes out so furiously that in the patient's weak state it is entirely out of the question to attempt to remove it to seek for the origin of the flow; continued stimulants and morphia.

2d. Another hemorrhage, but stopped by placing an additional plug soaked in sol. persulph. iron; patient almost exhausted; tongue perfectly dry; can hardly articulate; evidently sinking, but able to take his nourishment.

5th. Had another hemorrhage, but slight; during the last three days he has continued gradually to fail, and for the last forty-eight hours death has, in fact, seemed inevitable; sphacelation of arm and forearm complete; the only redeemable feature is that he can swallow and retain food; pulse 140; there seems to be a line of demarcation forming at the shoulder; no odour from the arm, which seems drying up; if any change has taken place, it is for the better; has been using glycerine on the tongue, and it is a little less dry; and some signs of pus seen around the compress in the axilla; the pressure of the pad of the tourniquet on the top of the shoulder has caused a deep slough at that point; bowels opened by an injection; slackened up the tourniquet, but did not disturb the original pad. Evening: On withdrawing the fetid cloths exterior to the pad to make the parts a

little more clean, hemorrhage again ensued. I now determined, although it was night, to examine the axilla and ligate if possible the bleeding vessel; accordingly, I removed the pad which had originally been inserted, and a fearful hemorrhage followed, but, forcing my fingers deeply in the wound, this was arrested; with the greatest difficulty, after an hour of the hardest work I ever performed, two fingers being constantly applied to the source of bleeding, the least relaxation being followed by a gush of blood, I finally succeeded in passing two ligatures deeply under the gangrenous tissues, the one above and the other below the bleeding vessel, which seemed to be the subscapular, supplied through the collateral circulation; on tightening these all hemorrhage ceased; considerable pain followed, and was probably due to the ligature including some portion of nerve; but this it was impossible to avoid. I was only too thankful to see the ligatures in place; the patient was almost dead from this protracted and painful procedure, but very hopeful and re-assured by the cessation of the bleeding, was willing to undergo anything for life; a chill threatened to come on which was warded off by a free use of brandy and hot drinks. While working in the sloughy cavity I found pus exuding in all directions, but especially from the region of the shoulder-joint, and from the great pain in that locality I felt convinced that the slough or the pressure of the tumour had involved the joint.

6th. Pulse quick; tongue dry; removed the charpie from the axilla, and there was no trace of hemorrhage; takes stimulants and nourishment well; the line separating the dead and living part more complete.

7th. Pulse weaker and more rapid; tongue dry, and copious perspiration; poultice applied over the shoulder.

9th. Pulse quick and very weak; tongue dry and features pinched; voice feeble and hoarse; never refuses nourishment; keeps up wonderfully.

10th. More comfortable to-day; two movements of the bowels during the night; good pus in the axilla, and the cavity seems contracting; believing that he could take an increased amount of nourishment, I ordered one raw egg every second hour, day and night, with half an ounce of brandy.

11th. Has taken one dozen eggs since yesterday, and relishes them; there is an increased vitality in the tissues in the vicinity of the gangrenous arm.

12th. Sixtieth day and patient more comfortable; tongue more disposed to be moist; one pint of champagne ordered additional.

16th. Better; the line of demarcation is deep and fully formed; there is very little odour; the arm drying up, the fingers shrivelled; decided that no attempts should be made to remove the part until the patient seems to suffer from its presence; has still a rapid pulse and hurried respiration; tongue soon becomes dry when sleeping, although it has lost its extreme dry and cracked condition; it is now twenty days since the first hemorrhage, and twelve since the last, and forty-six since the separation of the subclavian ligature.

18th. Has had some cough for the past few days; but general condition so good that I concluded to remove the dead member; cutting through the dried tissues following the line of separation, the limb was soon taken off, the bone was sawed through a little above its middle; the remaining portion of the humerus appeared entirely devoid of vitality, and will require removal at some future time.

20th. Pulse and skin better; gaining strength rapidly; has taken one

hundred and twenty eggs during the past ten days, and they have been of great service; ordered them less frequently.

21st. This morning the attendant observed Francis' face become very pale, and on examination another hemorrhage was found to have taken place. Dr. Williams found him exceedingly weak; scarcely any pulse; the armpit was again plugged with charpie and Monsel's salt, and the tourniquet readjusted. 11 A. M. I found him excessively prostrated and hardly expected him to revive; he came up well under increased stimulants; on removing the plug from the axilla I found blood oozing from some small vessels about the neck of the humerus, which proved to be the circumflex humeri, which have sloughed; continued the iron and pressure.

26th. Doing well; granulations pale; Monsel's salt applied to site of the last hemorrhage.

28th. Considerable pain on the top of the shoulder; while pressure upon the part forces pus into the axilla in considerable amount.

Feb. 1. Tissues about wound contracting very well; granulations red, and pus healthy; is sitting up each day when the wound is dressed; no hemorrhage.

5th. At 12 o'clock noon Francis had a violent chill, which was followed by fever and sweating, and appears due to the irritation consequent upon the collection of matter in the shoulder-joint, and which has been collecting more of late, and which will soon demand an opening; takes gr. xvj quinia daily.

11th. Had a very bad night, and suffered greatly from the shoulder, which is exceedingly painful. 4 P. M. Assisted by Dr. Hunt, the patient having been etherized, I grasped the denuded portion of humerus, and, in rotating the bone, the shaft came away, leaving the head in the socket; an incision about three inches in length was made from the most prominent portion of the head of the bone to the axillary wound; its removal was quickly accomplished; the bone was surrounded by pus and some granulations observed about the cavity; the attachments of the muscles about the neck of the bone had disappeared from ulceration, and it was so loose that hardly any cutting was necessary. There was free oozing, but no arterial jets; about ten ligatures were applied and the cavity for safety filled with charpie, moistened with the solution of Monsel's salt. The bone removed was very offensive, and had evidently undergone absorption from the original pressure of the tumour, as well as from the action of the pus, being furrowed out and much absorbed in places; no unpleasant effects followed the administration of the ether.

14th. Doing well; lint soaked in lime-water placed in the cavity, which is granulating up nicely; sixteen grains of quinia taken daily with porter and English ale.

15th. Doing well; gaining each day, and far better since the operation of the eleventh.

19th. Ligatures all away; glenoid cavity filling up rapidly; general condition excellent; the tissues from the upper and outer portion of the arm are approximating and covering up the axillary opening.

21st. Discontinue the quinia and substitute the elixir cinchonæ.

28th. Allowed to be about; shoulder contracting. One hundred and seventh day since first operation; gaining strength daily; discharge much diminished, and perfectly healthy.

March 4. Has been up and walking about for several days past; wound dressed once a day; one or two strips of plaster keeps the large flap in its place, and union has almost entirely taken place.

9th. Discharged; wound almost well; one hundred and fifteen days since the subclavian ligation.

Remarks.—In the above case it will be seen that the disease came on insidiously, and probably existed for several months prior to its detection, the patient, however, continued to perform his arduous duties, and only discovered the tumour by accident; no serious trouble arose until after its rapid enlargement, when intense pain, loss of voluntary motion and sensation became prominent symptoms. The aneurismal sac had evidently much enlarged, softened, and then burst, when the blood became diffused into the adjacent loose tissues, which permitted the tumour to enlarge with rapidity.

The ligature was placed on the artery of the left side and between the scaleni, and came away on the eighteenth day with no difficulty following; the tumour sloughed, and on the forty-third day the first hemorrhage occurred during sleep, which amounted to more than two quarts, and almost proved fatal; the day previous at least six inches of one of the large nerves of the axillary plexus came away, which showed that a considerable portion of the axilla was sloughy and considerably undermined. Considering the extreme prostration which followed the hemorrhage, it was not practicable to withdraw the compress from the axilla to seek for the vessel which had bled until reaction was fully established.

Within forty-eight hours a violent chill came on obliging a delay, and an indefinite postponement of all operative measures; hemorrhage after hemorrhage followed in spite of the axillary pad and compressor, the least relaxation of which allowed arterial blood to escape. From the 27th of December to the 5th of January, ten hemorrhages occurred; the last, which was of considerable amount, left the patient in a fearfully exhausted state. The bleeding vessel, evidently the subscapular, was secured; although pyæmic symptoms were very marked, yet under vigorous stimulation and increased nourishment, the patient rallied, and soon was doing well; there was no further trouble until the circumflex humeri arteries sloughed, when a violent hemorrhage brought the patient to death's door; again he rallied and was soon in as good a condition as before.

The first few hemorrhages so drained the patient of blood, that the arm, all along but feebly supplied by the collateral circulation, lost its vitality, a violent chill being the premonitory symptom, while the pressure on the top of the shoulder, which was kept up during many days, obstructing the collateral circulation through the transversalis colli and supra-scapular vessels, hastened the death of the limb.

During the entire process of sphacelation there was very little odour arising from the part, the arm shrivelled up, and had a mummified appearance, the line of demarcation formed along the inner edge of the deltoid muscle and running up its outer edge for about two inches, and then backwards to the wound of the axilla.

When the patient began to suffer from irritation consequent upon nature's endeavours to remove the part, the sphacelated limb was removed, care being taken not to touch any of the living tissues, while the bone was divided considerably below the line of separation.

After the ligation of the subscapular I examined the sloughing axillary cavity, and found the aneurismal sac lying close to the clavicle; it was contracted, very dense, about three inches in length and one in breadth, and had withstood ulceration; no evidences of sac existed in any other portion of the cavity.

Abscess about the head of the humerus appearing, the remaining portion of bone was removed, Fig. 2, which was much softened; all the attachments of muscles and ligaments had given way, and little cutting was required. Convalescence was now very rapid and almost magical, for within four weeks the patient was dismissed the hospital comparatively well.

The following table exhibits the pulse and temperature of the right and left side before and after ligation, and was prepared by Dr. Williams, the resident physician.

	Date.	Pulse.	Right Axilla.	Left Axilla.	Right Hand.	Left Hand.
Nov.	8, evening,	108	100 $\frac{1}{4}$	100 $\frac{3}{4}$	101	96 $\frac{1}{2}$
"	9, "	112	100 $\frac{1}{2}$	100 $\frac{1}{4}$	100 $\frac{3}{4}$	96 $\frac{1}{2}$
"	10, "	110	100	100	99 $\frac{3}{4}$	98 $\frac{3}{4}$
"	11, "	112	99 $\frac{1}{2}$	100	99 $\frac{3}{4}$	97 $\frac{1}{2}$
"	12, "	116	100	99 $\frac{1}{4}$	98 $\frac{1}{2}$	97
"	13, "	116	99 $\frac{1}{2}$	99 $\frac{1}{2}$	99	96 $\frac{1}{2}$
"	14, 3 P. M.,	124	99	96 $\frac{1}{2}$	98 $\frac{3}{4}$	95 $\frac{1}{4}$
"	" 7 "	132	102 $\frac{1}{2}$	100 $\frac{1}{2}$	102	102
"	15, A. M.,	124	101	102 $\frac{1}{2}$	100 $\frac{1}{2}$	102

An interesting feature in the above table is the rapid rise in the temperature in the limb after the ligation. The power of endurance and the tenacity of life, as shown in this remarkable case, were greater than in any instance which has ever come under my notice; to the continued ability of the patient, even in periods of excessive exhaustion, to take and retain any amount of nourishment and stimulants may be in a great measure ascribed the successful issue. During a period of ten days of greatest prostration more than one hundred and twenty raw eggs were taken, with each half an ounce of brandy, besides each day the usual allowance of three quarts of milk and other nourishment in proportion.

The loss of the limb was deplored at the time, but had the patient recovered with the arm it would have been of no use, since many of the nerves had sloughed away, while others were so much injured by pres-

Fig. 2.



sure and inflammation of the adjacent parts, that it would have been a useless appendage. Should a similar case again present, I would be inclined, after the ligation of the subclavian, to make a free incision, evacuate the tumour, tie the axillary above and below the aneurism, if practicable, and hasten to bring about a healthy condition of the cavity occupied by the effused blood; and should the pressure of the aneurism have induced caries of the joint, and permanent injury to the axillary nerves, amputation at the articulation would then be required.

Fig. 3.

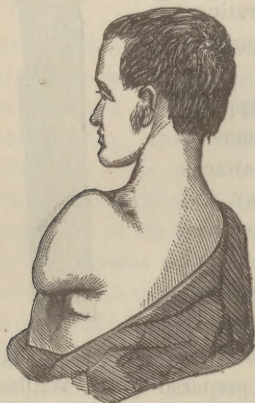


Fig. 4.



The accompanying figures from photographs (Figs. 3 and 4) give an accurate idea of the appearance of the stump when the patient was discharged from the hospital. Much more tissue covers the shoulder than was required, and gives the impression that the head of the bone is still in place, but it must be remembered that this was nature's flap, the irregularity of the line of union in front being the original tortuous line of demarcation.

Table of Subclavian Ligations which have occurred at Philadelphia.

CIVIL HOSPITALS.					
No.	Operator.	Date.	Place of ligation.	Disease or injury.	Result.
1	Gibson,	1828.	3d portion.	Rupture of axillary.	Died.
2	Drayton,	1859.	" "	Rupture of axillary.	Died.
3	Morton,	1866.	2d "	Spontaneous aneurism.	Recovered.
MILITARY HOSPITALS.					
1	Gross,		3d portion.	Gunshot wounds.	Died.
2	Coolidge,		" "	"	"
3	Hopkinson,		" "	"	"
4	Kennedy,		" "	"	"
5	Morton,		" "	"	"
6	Levis,		" "	"	Recovered.
7	Wells,		" "	"	Died.
8	Not stated,		" "	"	"

Morton, T.G.

Case of Axillary Aneurism. Successful Ligation of
left subclavian between the Sealani. Suppuration of
the Tumour, etc. etc. recovery. 4 woodcuts, Phil. 1867
1/6

